H2E SELF-ASSESSMENT GUIDE

Welcome to the H2E Partners for Change Program! This self-assessment can help you evaluate your facility's waste streams, identify opportunities for improvements, and enhance your environmental and waste programs. The guide includes questions on how your facility manages solid waste, hazardous waste, mercury, and other materials. H2E designed the questions to encourage you, and your colleagues, to think about new ways to manage waste and identify opportunities for eliminating waste at the source. H2E pioneers have found that source reduction and recycling activities can save the hospital money, freeing up resources for healthcare priorities. One large health system **saves nearly $200,000 annually** just by its switch to reusable mattress pads.

This guide includes sections on overall environmental policies and procedures, as well as information on specific waste streams (e.g., solid waste, regulated medical waste, chemical waste and mercury). It also includes a section on environmentally preferable purchasing for hospitals. Use the questions in the guide to assess where you are starting from, as well as to identify potential goals and action items.

The guide also suggests collecting baseline data, including the annual weight of every waste stream leaving the facility and the costs to manage that material. Many hospitals have no idea how much money is spent on total waste management. Documenting the quantity of materials you recycle and dispose of and the associated costs can help you prioritize actions. Tracking changes in the data will enable you to document results and report successes.

Use this guide to assist you in completing the H2E Annual Facility Assessment Summary and Goals Form. Once approved by the Office of Management and Budget, H2E will begin requesting that partners submit baseline data and annual progress report to H2E on this form.

And finally, use the guide to help you set achievable goals and prioritize key action plans to significantly improve your facility's environmental performance are key elements in the H2E Recognition and Awards program. H2E recognizes those facilities that make outstanding efforts in mercury elimination and overall waste reduction.

This H2E Self-Assessment is intended to provide a set of examples to assess your facilities environmental program's status, prioritize goals, and assist in the development of an action plan. It may not, however, identify all possible opportunities for pollution prevention, regulatory compliance, or improved worker safety regarding these issues. And finally, as hospitals across the country engage in these efforts, this self-assessment may evolve to reflect changes in the industry and the most up-to-date resources available. Please contact your local and state regulators for state specific regulatory information.

About the Sections

Each section has two main components:

- **Data Collection and Program Assessment.** It is important for every facility embarking on these programs to have centralized, baseline data collected from which to measure progress, including tonnage of materials moved and the associated costs. Worksheets are provided within specific categories to assist you in data collection and number crunching. In addition to data, there are policy and programmatic issues that also need to be addressed. In combination, this information collection format will help you prioritize your work.

  For additional information and assistance in completing your assessment, H2E provides tools and resources on our Web site – www.h2e-online.org. The "Technical Resources" link lists additional resources by state.

- **Issues to Consider – Sample Action Plans.** Use the sample action plan items to help you develop your goals and set of action plans to help you meet the H2E goals. The lists are examples and are not a complete list of projects you can initiate to meet your goals. H2E offers other tools and resources on our Web site www.h2e-online.org to assist with this work.

SECTION 1: GENERAL WASTE AND ENVIRONMENTAL MANAGEMENT

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Waste Management Data Collection What is your facility's annual disposal budget for ALL waste at your facility? _____ What is the total weight of ALL waste disposed at your facility? _____ *Use the attached worksheets for each waste stream to assist in the collection of these data. Combine the data to determine total weight disposed and total cost of waste disposal at your facility.*	Create a system that tracks waste generation rates and cost not only for the facility, but also for each department. Evaluate the total costs of generating waste at your facility, such as lost materials, regulatory compliance, costs that result from cleaning up accidents and safety training. Quantify the environmental, economic and other benefits of your waste reduction program. For help on tracking your facility's annual disposal budget, visit the H2E Web site at www.h2e-online.org, and see information on environmental accounting.
Policy Does your facility have a "Green Team" responsible for designing and implementing your environmental programs? ❑ Yes ❑ No Do you have a waste management policy that includes: • Hierarchy of waste management ❑ Yes ❑ No • Goals of waste management program ❑ Yes ❑ No • Handling and disposal procedures for all waste streams ❑ Yes ❑ No • Pollution prevention/source reduction, environmental commitment ❑ Yes ❑ No Does your hospital have any facility-wide goals related to pollution prevention efforts, including but not limited to: • Waste volume reduction efforts? ❑ Yes ❑ No • Waste toxicity reduction efforts? ❑ Yes ❑ No	Assign a project leader who will be responsible for collecting information, organizing the self-assessment, and forming the "Green Team". Form a waste reduction planning committee (Green Team) that includes representatives from as many departments as practicable, including but not limited to purchasing, infection control, facilities management, clinical area representatives, materials management, housekeeping/ environmental services and upper management. Develop a waste management policy that incorporates all policies and procedures related to waste management, including staff responsibilities for managing waste safely. Develop an "environmental principles statement" stating your facility's commitment to environmental programs.
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SECTION 1: GENERAL WASTE AND ENVIRONMENTAL MANAGEMENT

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Education Does your hospital provide waste education in the following areas for ALL staff: • General Waste management, including waste stream definitions, handling and disposal procedures for all waste? ❑ Yes ❑ No • Red bag or regulated medical waste - the proper identification, segregation and disposal? ❑ Yes ❑ No • Mercury: the health and environmental effects? ❑ Yes ❑ No • Mercury spill procedures? ❑ Yes ❑ No • Ethylene oxide: health and environmental effects of exposure, emergency procedures, etc.? ❑ Yes ❑ No • Hazardous Chemical Waste: proper identification, segregation, and disposal? ❑ Yes ❑ No Is proper waste management (all waste streams) part of the employee job description? ❑ Yes ❑ No	Implement waste and environmental programs training programs that may include: • New employee orientation, • Annual training, • Required or as-needed departmental in-services. Create an internal newsletter about waste and mercury use reduction, including information on what employees can do both at home and at work to protect the environment. Make safe waste management and minimization a job requirement.
Community Health Initiatives Do you communicate your environmental successes with the community? ❑ Yes ❑ No Do you share policies and procedures with other medical facilities? ❑ Yes ❑ No	Contribute to a community environmental improvement project that promotes waste or mercury use reduction, such as hosting a waste reduction educational event or a mercury thermometer exchange. Mentor other hospitals on waste reduction techniques, including developing case studies or hosting a tour. Collaborate with community and environmental leaders by inviting them to participate in your waste and mercury-use reduction planning committee.
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SECTION 2: SOLID WASTE MANAGEMENT

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Total amount of **SOLID WASTE** annually (tons): **SOLID WASTE** disposal cost per year **$**_____ How is **SOLID WASTE** disposed: *(Record % for each.)* _____% Land-filled _____% Incinerated *(TOTAL MUST EQUAL 100%)* _____% Other Do you have a solid waste reduction strategy? ❑ Yes ❑ No If you incinerate your solid waste, is there a plan to try to eliminate incineration? ❑ Yes ❑ No Have you ever visited your landfill? ❑ Yes ❑ No Do you have a contact person who can answer technical questions related to solid waste practices in your market: Name: Phone #: Solid waste hauler/company(s): Name: Phone #: Landfill Operator: Name: Phone #:	Complete the solid waste assessment worksheet (Appendix A) to determine total volume and cost of your solid waste management program. Reduce total cost for solid waste reduction by developing a comprehensive solid waste reduction strategy that includes: • Purchasing policies that encourage the purchase of materials with less packaging that are recyclable, reusable, and/or durable. • Recycling policies that will help reduce solid waste that is incinerated or landfilled. • Reuse policies that assess opportunities to reuse materials either through in-house reuse programs or community donation programs. • Comprehensive waste segregation program that promotes recycling, reuse and reduction of waste. Develop a non-incineration policy that reflects a commitment to public health. Consider alternatives. • Develop a policy to ensure that hazardous chemicals, mercury, PVC products are not being incinerated. • If you are operating an incinerator on-site, ensure you are in compliance with the medical waste incinerator rules. • If you send your waste off-site for incineration, audit the facility for environmental and OSHA compliance. Establish a relationship with your solid waste hauler and/or landfill operator to “problem solve” solid waste issues.
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SECTION 3: WASTE REDUCTION, RECYCLING, AND REUSE

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Total amount of **RECYCLED/REUSED** annually (tons): _____ **RECYCLED/REUSED** disposal cost per year $ _____	Complete the recycling assessment worksheet (Appendix B) to determine total volume and cost of your recycling program. Create a system that tracks each recyclable waste stream including generation rates and cost not only for the facility, but also for each department.
Is recycling and reducing your waste a part of everyone's job description? ❑ Yes ❑ No Are recycling containers readily available for hospital visitors and staff? ❑ Yes ❑ No • Paper bins in every office area? ❑ Yes ❑ No • Paper bins by every copier and printer? ❑ Yes ❑ No • Beverage container bins in every kitchen, break room, conference room? ❑ Yes ❑ No	Develop a comprehensive waste segregation and recycling program ensuring proper placement and access to all appropriate containers. Encourage office practices that reduce wastepaper generation, such as copying on two sides, using electronic mail, posting information on announcement boards, and reusing scrap paper for notes and message pads.
If you recycle paper, does the recycler guarantee paper destruction for confidentiality? ❑ Yes ❑ No	Consider combining your paper recycling programs with your confidential paper management policy. This will increase your recycling volume and improve participation in confidential management compliance.
Do you know how recycling revenues are used? (applied to general revenues, donated to charity, etc.): ❑ Yes ❑ No	Consider a policy where recycling revenues go back into other waste reduction efforts, particularly those efforts that cost more; or to fund an employee recognition program for those that take a leadership role in waste reduction.
Do you have a comprehensive list of all recycling vendors: ❑ Yes ❑ No	Centralize all recycling vendor information for every item that is recycled or reused by an outside vendor.
Do you have an Environmental Preferable Purchasing Policy to encourage: • Waste reduction through reduced use of individually wrapped items? ❑ Yes ❑ No • Elimination of duplicate forms? ❑ Yes ❑ No • Increased use of reusable items? ❑ Yes ❑ No	Eliminate duplicate admission kits. Do not open/unwrap surgical supplies unless there is a reasonable certainty they will be used during the procedure. Eliminate individual condiment packages in the food service. Reduce subscriptions to medical publications and unsubscribe to junk mail outlets. Purchase equipment that will reduce waste (e.g., hand-dryers in restrooms to eliminate paper towel waste).
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SECTION 3: WASTE REDUCTION, RECYCLING, AND REUSE

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Do you have purchasing policies and procedures that assess and encourage the opportunities to use reusable items? ❑ Yes ❑ No	Use items that can be washed or sterilized, such as bed pans, urinals, linens – surgical drapes, underpads, cloth diapers, gowns, pillows, eating utensils, instrument trays and water pitchers. Reduce beverage prices for personnel who supply their own reusable cups. Use washable glassware in labs. Use washable food service items. Wash and reuse mop heads and rags.
Do you donate any equipment or supplies to community groups or other agencies? ❑ Yes $ _____ ❑ No If yes, do staff or the community know of these efforts? ❑ Yes ❑ No	Implement a collection/donation program of unused surgical packs, open, clean but unused supplies, and unwanted but useable "stuff" in order to: 1) Reduce waste, 2) Assist local organizations (schools, EMT training, vets, animal shelters) or developing countries, 3) Assess what you might otherwise be throwing away.
Universal Wastes Recycling – do you recycle: • Batteries? ❑ Yes ❑ No • Fluorescent lamps? ❑ Yes ❑ No • Paints and paint thinner? ❑ Yes ❑ No • Mercury? ❑ Yes ❑ No	Implement comprehensive programs for the safe handling and disposal of universal wastes. Understand universal waste regulations and specific collection, handling, storage and shipping requirements for each material. Implement recycling programs for products that contain potentially hazardous waste and ensure these items are not disposed of improperly.
Do you compost food waste, organics and yard waste? ❑ Yes ❑ No	Implement a comprehensive compost program. Is there a compost facility in your region? Are there opportunities to collect yard waste on campus? Explore compost opportunities in your area.
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SECTION 4: REGULATED MEDICAL WASTE

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Total amount of **REGULATED MEDICAL WASTE (RMW)** annually (tons): _____ **RMW** disposal cost per year: $ _____	Completing the RMW assessment (Appendix C) to determine the amount of RMW currently generated is an important first step to assessing opportunities for improvement. Many facilities have realized significant RMW savings by improving segregation, purchasing and waste packaging practices.
Treatment Technology *(Record percentage for each – total should equal 100 percent.)*: _____% Autoclaved _____ % Microwaved _____% Chemically treated _____ % Incinerated _____ %Treated on site _____ % *other*	Refer to "Non-Incineration Medical Waste Treatment Technologies – A Resource Guide" and/or "Medical Waste Treatment Alternative Technologies" available on the Web at http://www.noharm.org/ EXIT H2E
If you incinerate your RMW, is there a plan to try to eliminate incineration? ❑ Yes ❑ No Do you know if your state requires incineration of pathological or chemotherapy waste through regulation? ❑ Yes ❑ No Do you segregate pathological waste from general infectious waste? ❑ Yes ❑ No Have you specified how you want your waste treated? ❑ Yes ❑ No	Develop a non-incineration policy that reflects a commitment to public health. Consider alternatives. If you are operating an incinerator on-site, make sure you are in compliance with the medical waste incinerator rules. If you send your waste off-site for incineration, audit the facility for environmental and OSHA compliance. Minimize or eliminate incineration by specifying to your RMW hauler that general infectious waste be autoclaved. Segregate pathological waste for incineration if required by your state.
Do you have a comprehensive waste segregation plan that ensures hazardous materials are not disposed of in RMW containers? ❑ Yes ❑ No Has your staff been trained on the environmental and human health impacts of improper waste segregation and disposal practices? ❑ Yes ❑ No Do you reduce/eliminate chlorine-containing supplies, and reduce the amount discarded that goes to medical waste incinerators? ❑ Yes ❑ No Do you use cadmium-free bags, boxes or containers? ❑ Yes ❑ No	Develop a policy to ensure that hazardous chemicals, mercury, and PVC products are not being incinerated. Assess and replace chlorine treated medical waste, as well as chlorine-containing products that are being incinerated, for example PVC products (e.g., Patient Identification Bracelets and Cards, Shower Curtains, IV Bags and Fluid Collection Devices. Assess opportunities to minimize incineration of chlorine containing items (a precursor to the formation of dioxin). Purchase cadmium-free bags and containers. See www.sustainablehospitals.org EXIT H2E for more information.
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SECTION 4: REGULATED MEDICAL WASTE

Data Collection and Program Assessment	Issues to Consider – Sample Action Plan Items
Does your hospital have a program to minimize the amount of waste unnecessarily discarded in "red bags" or regulated medical waste containers? ❑ Yes ❑ No If so, what was the percent of RMW reduction since you started your program? Reduction Goal: _____ % Do you have an education or training program on segregating, handling, and minimizing regulated medical waste (type of training, who receives, who provides, how often)? ❑ Yes ❑ No Note: Many facilities have realized 20-50% reductions in RMW by improving waste segregation and purchasing practices.	Conduct an RMW audit to assess opportunities to reduce RMW. Provide additional training and signage to increase staff awareness of infectious waste definitions. Implement an RMW Segregation Plan, including: • Limiting access and size of red bag containers, • Segregating procedures in the operating rooms, • Removing red bag waste containers from non-essential areas. Assess opportunities to reduce RMW by looking at how and where waste is collected and transported. RMW might be bagged, double bagged and then place in a box with more double red bags. Track cost savings and celebrate success to all staff. Use the success to drive improvements in other aspects of waste reduction.
How do you problem solve RMW problems? * Do you keep track of in-house collection and handling problems (e.g., needlesticks, ergonomics, improper segregation)? ❑ Yes ❑ No Do you have any problems managing RMW with your hauler or the community? ❑ Yes ❑ No	*Develop a policy to not only identify problems, but give authority to a problem-solver to address the issues. For instance, if sharps are found in bags, who is responsible to determining who is responsible and do they have the authority to rectify the problem? Identify a responsible person, then establish protocols and procedures to problem solve.
Do you have a policy/procedure for the safe handling and disposal of Cytotoxic Drugs? ❑ Yes ❑ No Are staff trained in safe handling, safety, waste minimization and spill containment and clean-up procedures in a manner to prevent exposure? ❑ Yes ❑ No Are chemotheraphy waste containers strategically placed to collect only chemo waste, and not other regulated medical waste or trash? ❑ Yes ❑ No	See OSHA Instruction PUB 8-1.1, January 28, 1986 – Guidelines for Cytotoxic Drugs. Identify opportunities through training, education and container placement to minimize chemotheraphy waste. See the list of RCRA U-listed anti-neoplastic agents: http://yosemite.epa.gov/osw/rcra.nsf/b098e2ce61abf52285256adf00690fc4/0f7f73d04c4dcb8a8525670f006c1bb7?OpenDocument
Waste Hauling Company/Contact: Have you audited your RMW hauler? ❑ Yes ❑ No	Audit your waste hauler and treatment facility to ensure environmental and OSHA compliance.
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SECTION 5: HAZARDOUS WASTE AND PERSISTENT, BIOACCUMULATIVE, AND TOXIC CHEMICALS

Data Collection and Program Assessment Items	Issues to Consider – Sample Action Plan
Total amount of **HAZARDOUS CHEMICAL WASTE** Annually (pounds, tons, cubic yards, other): _____ **(Include RCRA chemotherapy waste)** **HAZARDOUS CHEMICAL WASTE** disposal cost per year **$**_____ Total amount of **HAZARDOUS DRUGS** (chemotherapy and other hazardous drug waste) generated per year (pounds/tons/cubic yards): _____	See H2E's chemical minimization plan on www.h2e-online.org for information on reducing hazardous chemicals and PBTs in your facility. Completing the HW assessment worksheets (Appendix D) to determine the amount of hazardous waste currently generated is an important first step to assessing opportunities for improvement.
Does your facility have an EPA Identification number? What is your hazardous waste generator status? Large Quantity Generator? Small Quantity Generator? Hazardous Waste Program Coordinator: _____ Emergency Response Coordinator: _____ Are either or both of these staff charged with reducing the amount of materials used, initiating waste minimization programs? ❑ Yes ❑ No	Learn about regulations governing hazardous wastes at www.epa.gov/epaoswer/hotline/rmods.htm. Read "Pollution Prevention for Selected Hospital Waste Streams" at http://es.epa.gov/oeca/fedfac/fflexp2/hospital.html Pollution prevention opportunities for hazardous waste streams commonly found at hospitals and medical facilities. City of Palo Alto, California's Regional Water Quality Control Plant (1995. free) http://www.city.palo-alto.ca.us/cleanbay/pdf/hosp.pdf EXIT H2E
Have employees been trained to minimize the use of hazardous chemicals and to properly handle and dispose of them to ensure that chemicals are not improperly disposed of down the drain or in the trash (infectious, solid or recycling)? ❑ Yes ❑ No Are Material Safety Data Sheets maintained and made readily available to all employees? ❑ Yes ❑ No Are ALL hazardous materials properly and consistently labeled? ❑ Yes ❑ No Do you have a written spill prevention plan and are spill kits available and accessible? ❑ Yes ❑ No	Implement a comprehensive hazardous materials training program including an MSDS management program, hazardous materials identification, labeling, handling, storage, disposal, spill prevention and clean up procedures.
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SECTION 5: HAZARDOUS WASTE AND PERSISTENT, BIOACCUMULATIVE, AND TOXIC CHEMICALS

Data Collection and Program Assessment Items	Issues to Consider – Sample Action Plan
What steps are being taken to decrease hazardous chemicals in your facility? Have you done a comprehensive assessment of opportunities to reduce hazardous chemicals in the lab? ❑ Yes ❑ No Have you considered using less hazardous cleaning chemicals in housekeeping and facilities departments?	Develop a list of highly hazardous substances and implement a purchasing policy to ban their purchase. (H2E's Chemical Minimization plan has prioritized highly hazardous substances). Assess opportunities to use smaller containers in lab procedures. See Microscale Chemistry information - www.silvertech.com/microscale/index.html EXIT H2E Purchase maintenance and housekeeping chemicals in concentrated form for dilution onsite. See Janitorial Products and Pollution Prevention Web site: http://www.westp2net.org/Janitorial/jp4.htm EXIT H2E
Do you capture and recycle silver and X-ray film from radiology? ❑ Yes ❑ No Do you have a management and minimization plan for the following chemicals? ethylene oxide ❑ Yes ❑ No glutaraldehyde ❑ Yes ❑ No formaldehyde ❑ Yes ❑ No solvents ❑ Yes ❑ No Does your hospital redistill solvents or formalin for reuse? ❑ Yes ❑ No If yes, volume of avoided hazardous waste disposal: _____ gallons Volume of avoided solvent purchases due to redistillation: _____ gallons	Implement a silver recovery program, including x-ray films. Switch to alternative liquid sterilants, such as peracetic acid, acetic acid and hydrogen peroxide. (See EtO reduction guide in H2E Tools and Resources page – www.h2e-online.org. Assess opportunities to purchase solvent recovery stills to recycle laboratory waste solvents, such as xylene, formalin and alcohol. *This not only reduces hazardous waste disposal volume but also disposal costs and purchase costs of new chemicals.*
<u>Persistent, Bioaccumulative Toxics (PBT)</u> Do you know what PBTs are and what the connection is to healthcare? ❑ Yes ❑ No List of PBTs possibly found in or associated with healthcare: Mercury Dioxin Lead PCBs Hexachlorobenzene- Mercury – see Mercury Management/Elimination Section below. How are you disposing of lead containing items such as aprons and lead packaging? ❑ Yes ❑ No	Learn more about PBTs – EPA's PBT Chemical Program at http://www.epa.gov/pbt/. For a comprehensive list of persistent and toxic chemicals in addition to the EPA PBT priority list see Appendix E. Initiate programs to eliminate PBT pollution. For example, address dioxin issues by eliminating the incineration of chlorine containing products such as PVC, chlorine bleached paper, and RMW treated with chlorine bleach. Initiate mercury elimination programs.

SECTION 5A: MERCURY CHECKLIST

MERCURY *For each of the following statements, please check the box that most accurately describes the mercury reduction practices at your facility:*	**Yes - Plan in Place And Implemented**	**Yes - Plan in Place But Not Implemented**	**No Plan in Place – Need More Info**
1. Do you have a corporate or facility policy statement that includes a resolution or pledge for the reduction and virtual elimination of mercury?			
2. Do you have a Mercury Management Policy that includes: a. Protocols for safe handling? b. Mercury spill clean-up procedures? c. Disposal procedures such as recycling or regulated safe disposal to avoid disposal in the waste stream (including dental amalgam and other mercury containing items)? d. Education and training of employees about facility protocols, including information about mercury and its effects on human health and the environment?			
3. Have you completed a mercury audit, including an inventory of all mercury devices/sources (clinical and facility? Have you labeled those facility devices containing mercury? Do you have a plan in place to replace devices with non-mercury devices? See Appendix E for a listing of mercury sources.			
4. Do you have a committee or process in place to regularly review mercury use reduction/elimination progress for continuous quality improvement?			
5. Have you replaced mercury thermometers?			
6. Have you eliminated the practice of sending mercury thermometers home with patients (e.g., new mothers, oncology, pediatric)?			
7. Have you replaced mercury blood pressure units?			
8. Have you replaced other mercury-containing cantor tubes, dilators, others?			
9. Are you managing and recycling fluorescent bulbs?			
10. Have you implemented battery collection programs?			
11. Do you have a "purchasing policy statement" which bans the purchase of mercury containing items?			
12. Do you require a mercury disclosure on all products coming into your facility?			
13. Have you replaced any mercury containing lab chemicals? See Appendix E for a listing of mercury sources in the lab.			
14. Other:_____			

SECTION 5B: MERCURY SAMPLE ACTION PLANS

MERCURY	
Data Collection and Program Assessment Items	**Issues to Consider – Sample Action Plan**
Mercury Management	Designate a mercury reduction team and identify its primary contact. Draft a corporate or facility policy statement that includes a resolution or pledge for the reduction and virtual elimination of mercury. Inventory and evaluate current mercury product/equipment practices at your facility. Evaluate alternatives to the mercury products/equipment currently being used. Label mercury-containing products to ensure proper use and disposal. Establish a mercury management policy that includes: • Protocols for safe handling, including procedures for cleaning and refilling instruments containing mercury, • Mercury spill clean up procedures, • Disposal procedures such as recycling or regulated safe disposal of mercury and mercury containing devices to avoid disposal in the waste stream (including dental amalgam and other mercury containing items), • Education and training of employees about facility protocols, including information about mercury and its effects on human health and the environment, • A process to regularly review mercury use reduction/elimination progress for continuous quality improvement.
Mercury In Chemicals	Phase out nonessential uses of mercury-containing chemicals in laboratories. Investigate alternatives to mercury preservatives (e.g., thimerosal, phenylmercuric acetate, phenylmercuric nitrate) found in pharmaceutical products (e.g., merbromin/water solution, ophthalmic and contact lens products, nasal sprays and vaccines). Establish a program to identify mercury content of cleaners and degreasers and choose mercury-free products, where possible.
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SECTION 5B: MECURY SAMPLE ACTION PLANS

MERCURY	
Data Collection and Program Assessment Items	**Issues to Consider – Sample Action Plan**
Community Health Initiatives	Implement a voluntary "take back" program for employees or the community (e.g., thermometers, batteries). Develop case studies on your past experiences to share with other hospitals. Contribute information on mercury alternatives to the Sustainable Hospitals Project Web site. Educate staff and the community about the human health and environmental effects of mercury. Mentor another hospital in their evaluation of mercury at their facility.
Mercury in Clinical Devices	Replace mercury-containing thermometers with non-mercury equivalents (a limited number of mercury thermometers may be kept on-site for use in critical care applications). Phase out the use of mercury-containing blood pressure monitoring devices (sphygmomanometers). Phase out the use of mercury-containing gastrointestinal tubes (e.g., esophageal dilators, cantor tubes, miller abbot tubes, feeding tubes). Discontinue sending mercury thermometers home with newborns and other patients.
Facilities	Establish a program to replace mercury-containing electrical equipment (tilt switches, float switches, thermostats, reed relays, thermostat probes, plungers, and displacement relays) during facility remodeling/renovation programs. Establish procedures to remove historical mercury from sewer pipes, sumps and sink traps. Establish a recycling program for collection and disposal of fluorescent lamps. Substitute non-mercury alternatives for mercury-containing batteries and provide convenient collection points for recycling of mercury-containing batteries.
Purchasing – Environmentally Preferable Purchasing Mercury-free Policies	Develop a purchasing policy statement that bans the purchase of mercury containing items without prior approval (for example, where a non-mercury device or chemical is not available, the request to purchase should include a plan to manage the mercury safely and to collect all waste). Require mercury disclosure (i.e. certificate of analysis) on all products coming into the facility
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SECTION 6: GREEN PURCHASING

Data Collection and Program Assessment Items	Issues to Consider – Sample Action Plan
Do you have "Environmentally Preferable Purchasing" policies and the ability to purchase these products through your vendors/GPO? ❑ Yes ❑ No	Adopt purchasing guidelines that encourage the use of environmentally friendly products and services. Request that vendors provide information on the environmental attributes of products they carry, including: • Recycled content • Reusable • Recyclable • Mercury content • PBT content • Others?
Please indicate whether each of the following environmentally-preferable purchasing practices are being implemented at your facility *(Answer Yes or No to each. Answer "Yes" even if the program is not fully implemented*):	Request that vendors provide environmentally preferable products if currently unavailable. Test new products or equipment that reduce mercury use or waste generation.
Reduced hazardous materials? ❑ Yes ❑ No	Are there less hazardous or non-hazardous alternatives?
Minimize packaging? ❑ Yes ❑ No Packaging that is recyclable/returnable or reusable? ❑ Yes ❑ No	Eliminate excess packaging in surgical packs and supply containers. Consider individually wrapped items when bulk surgical kits may increase unnecessary waste generation.
Products made from recycled content material (Office paper - at least 30% recycled content)? ❑ Yes ❑ No	Purchase products that contain recycled materials such as paper, containers, packaging, and cardboard.
Reusables vs. Disposables Linen ❑ Yes ❑ No Bedpans ❑ Yes ❑ No Suture kits ❑ Yes ❑ No Others? ❑ Yes ❑ No	Assess opportunities to use reusables instead of disposables.
Supplies distributed in reusable shipping containers? ❑ Yes ❑ No	Order supplies in reusable totes. Use bulk-dispensing equipment. Use reusable shipping containers and pallets for general supplies.
Specific hazardous materials issues? Cadmium-free red bags ❑ Yes ❑ No Aerosols ❑ Yes ❑ No Pesticides ❑ Yes ❑ No	
Does your facility have a concern about PVC products? ❑ Yes ❑ No	See Appendix F for more PVC information and Web links.
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SECTION 7: FACILITIES

Data Collection and Program Assessment Items	Issues to Consider – Sample Action Plan
Do you have a policy in place to conserve energy and water? ❑ Yes ❑ No What specific conservation efforts are you engaged in? Do you use energy-efficient lighting? ❑ Yes ❑ No Do you use water-efficient equipment? • Low-flow toilets? ❑ Yes ❑ No • Recalculating water in labs? ❑ Yes ❑ No • Other? ❑ Yes ❑ No	Incorporate energy-efficiency changes in your facility renovation programs. Install energy-efficient computer equipment, lights and appliances (follow U.S. EPA's ENERGY STAR guidelines). Participate in EPA's Green Lights Program. Participate in EPA's ENERGY STAR Program. Implement water conservation measures for the surgical scrub area (i.e., use automated or foot-operated faucets on scrub sinks).
Are housekeeping and facilities staff trained to minimize the use of cleaning products, solvents and chemicals? Are they trained to handle and dispose of it safely, including using proper spill procedures? ❑ Yes ❑ No Is there an EPP policy to minimize or eliminate mercury, chlorine, or phosphate-free cleaning products? ❑ Yes ❑ No	Purchase maintenance and housekeeping chemicals in concentrated form for dilution onsite. See Janitorial Products and Pollution Prevention Web site: http://www.westp2net.org/Janitorial/jp4.htm Identified and, where feasible, phased out the use of cleaning and maintenance products that contain toxic substances such as metals (mercury, copper, zinc, or chromium), solvents, and try-butyl tin.
Do you use mercury-free motion switches? ❑ Yes ❑ No Do you use mercury-free temperature gauges? ❑ Yes ❑ No Is all mercury-containing facility equipment labeled for proper disposal and are non-mercury alternatives when replaced? ❑ Yes ❑ No	See the Mercury Virtual Elimination Plan for a comprehensive list of mercury elimination projects.
Do you have an integrated pest management plan that reduces to the greatest extent possible the use of chemical pesticides? ❑ Yes ❑ No	Xeriscape, or use landscape with slow-growing, drought tolerant native plants to reduce water and chemical inputs.
Does your facility have a policy on using water-based paints? ❑ Yes ❑ No Do you collect your paint thinner (check with your hazardous waste hauler on recycling options?) ❑ Yes ❑ No	
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APPENDIX A

SOLID WASTE WORKSHEET DATE: _____

A Location	B Container Type And Size	C Avg. Wt. Per Haul	D Haul Schedule (See Table)	E Hauls Per Yr	F Cost Per Haul	G Total Haul Cost (E X F)	H Annual Weight Tons/Yr	I Tipping Fee/Ton	J Total Tipping Cost (H X I)	K Other Costs	L Annual Cost (G+J+K)
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
					$	$		$		$	$
TOTALS					$			$		$	$

HAUL SCHEDULE	Conversion Factors
1. Prescheduled	1 cubic yard liquid = 1616#.
2. On Call As Needed	1 cubic yard compacted waste ~ 1300#.
3. Other	1 cubic yard non-compacted MSW = 350#.

APPENDIX A (cont.)

Example:

A Location	B Container Type And Size	C Avg. Wt. Per Haul	D Haul Schedule (See Table)	E Hauls Per Yr	F Cost Per Haul	G Total Haul Cost (E X F)	H Annual Weight Tons/Yr	I Tipping Fee/Ton	J Total Tipping Cost (H X I)	K Other Costs	L Annual Cost (G+J+K)
Loading Dock	40 yd. Comp.	8500 lbs	1	104	$125	$13,000	442	$95	$41,990	$	$54,990
Clinic	10 yd dumpster	800 lbs	1	104	87	$9,048	49	$95	$4,655	$2,400	$16,103
TOTALS						**$22,048**	**491**	**$**	**$46,645**	**$2,400**	**$71.093**

Instructions for Completing Worksheet

1. Location/Container Size
   - List primary container first
   - Specify type and size

2. Weight Per Pull
   - Actual weights are better but if you are being charged by the container and not the weight, please clarify and estimate weight.

3. Hauling Schedule
   - The purpose of understanding haul schedules is to assess opportunities to reduce costs. Ask the following questions for each container:
     - Are the containers going out full?
     - Can you monitor fullness of containers and have the ability to minimize the number of hauls per month?
     - Is the container the appropriate size?
     - Can you alter the schedule to maximize the load and therefore reduce hauling costs?

4. Annual Weight
   - Actual weights are better but if you are being charged by the container and not the weight, please clarify and estimate weight.

5. Costs
   - Tipping Fees: the per ton fees charged at the disposal site.
   - Cost per pull: might include other transportation fees

APPENDIX B

RECYCLING AND REUSE DATA COLLECTION Date:

	Recycled? YES	NO	Reduction Strategy	Lbs. Month	Revenue (Cost) /month
Cardboard	❑				❑
Paper, white	❑				❑
Paper, mixed	❑				❑
Newspaper	❑				❑
Boxboard	❑				❑
Plastic, #1PET	❑				❑
Plastic, #2 HDPE	❑				❑
Plastic, #5 polypropylene	❑				❑
Plastic, #6 PS	❑				❑
Plastic, mixed	❑				❑
Shrink wrap	❑				❑
Reusable linen	❑				❑
Glass, clear	❑				❑
Glass, colored	❑				❑
Glass, mixed	❑				❑
Oil (cooking, motor)	❑				❑
Steel cans	❑				❑
Aluminum cans	❑				❑
Food waste (composting)	❑				❑
Food donation	❑				❑
Pallets	❑				❑
Wood	❑				❑
Tyvek	❑				❑
Transparencies	❑				❑
Ink jet cartridges	❑				❑
Foam peanuts	❑				❑
Ice packs / coolers	❑				❑
Computers / equipment	❑				❑
Toner cartridges	❑				❑
Printer ribbons	❑				❑
Sharps containers	❑				❑
Batteries	❑				❑
Fluorescent lamps	❑				❑
Landscape (composting waste)	❑				❑
Construction/demolition debris	❑				❑
Solvents/fixers	❑				❑
X-ray film	❑				❑
TOTAL					

APPENDIX C

RMW WORKSHEETS

Table A – WORKSHEET FOR CALCULATING MONTHLY COST AND VOLUME OF REGULATED MEDICAL WASTE

Waste Type: _____ Date:_____

General infectious, pathological, general chemo (non-RCRA)

Date of Pick-up	A Pounds of Red Bags OR # Containers Removed	B Price / Pound OR Price / Container	C Processing Cost (AXB)	D Pick-up/ Hauling Costs	E Surcharges	F Total Cost per Pick-up (C+D+E)
Continue for entire month						
TOTALS /MO	*Lbs./mo		$ /mo	$ /mo	$ /mo	$ /mo
Annualize	Tons/year		$ /yr	$ /yr	$ /yr	$ /yr

*If you are charged by the container/box, estimate the average weight per box to determine the lbs/month. Does not need to be exact to be helpful.

APPENDIX C (cont.)

Table B - WORKSHEET FOR CALCULATING TOTAL COSTS OF REGULATED MEDICAL WASTE

	General Infectious Waste*		Pathological Waste*		Chemotherapy Waste		
	Average per Month Costs	**Annual Cost**	**Average per Month Costs**	**Annual Cost**	**Average per Month Costs**	**Annual Cost**	**Total Annual Cost**
Volume – tons (Table A)							
Total Monthly Costs (Table A)	$	$	$	$	$	$	$
Inhouse Treatment Costs: Validation Testing, etc.	$	$	$	$	$	$	$
Equipment Rental/Lease (depreciation, maintenance)	$	$	$	$	$	$	$
Supply Costs from hauler • Boxes • Reusable Containers • Bags • Tape • Labels • Other	$	$	$	$	$	$	$
Labor • # staff dedicated to boxing the waste? • How much time is spent? • Average hourly rate? Labor cost of boxing RMW =Time spent X number of staff X hourly rate:	$	$	$	$	$	$	$
Other (ash disposal, etc.)	$	$	$	$	$	$	$
Total	$	$	$	$	$	$	$

Note:

- Some facilities segregate their general infectious and pathology waste for separate and different treatment methods. If you collect general infectious and pathological waste together, use the first column.
- Chemotherapy waste here is considered general, trace waste – not RCRA regulated.
- It may be important to track these wastes separately because 1) there may a cost differential in disposal, 2) different training programs may be required to reduce each waste stream, 3) tracking volume data separately might indicate where improvements can be made.

APPENDIX D

HAZARDOUS CHEMICAL WASTE WORKSHEET

Date of Pick-up	Pounds of Hazardous Chemical Waste Removed	Price Per Pound =	Cost	Reductions Strategy?

APPENDIX E

A LIST OF GREAT LAKES PERSISTENT TOXIC SUBSTANCES (GLPTs)*

Halogenated Hydrocarbons	**Non-Halogenated Hydrocarbons** Benzene
Dichlorobenzenes	2, 4-Dinitrotoluene
Ethylene Dibromide	Ethylbenzene
Hexachlorobenzene	Isophorone
Hexachlorobutadiene	Nitrobenzene
Hexachloroethane	Phenol
Methyl Chloride	Phthalates:
Methylene Chloride	*butylbenzyl pthalate
Nonachlor	diethyl hexyl pthalate, (DEHP)
Octachlotostyrene	*diethyl pthalate
Pentachlorobenzene	dimethyl phthalatedi-n-butyl pthalate
Polychlorinated Biphenyls (PCBs)	Polynuclear Aromatic Hydrocarbons (PAHs):
Tetrachlorobenzene	Acenaphthalene
Tetrachlorodibenzodioxin (TCDD)	Acenaphthene
Tetrachlorodibenzofuran (TCDF)	Anthracene
Tetrachloroethylene	Benzo (a) anthracene
Trichloroethylene	Benzo (a) pyrene
Trichlorophenols	Benzo (k) fluoranthene
	Chrysene
	Fluorine
	Indeno (1,2,3) pyrene
	Naphthalene
	Phenanthrene
	Pyrene
	Terphenyl
	Toluene
	* these two substances have been removed from the list of GLPTs since the inception of the project

Metals	**Pesticides**	**EPA Priority PBTs**
Antimony	Aldrin	Aldrin/dieldrin
Arsenic	Chlordone	Benzo (a) pyrene
Beryllium	DDD	Chlordane
Cadmium	DDE	DDT, DDD, DDE
Chromium	DDT	Hexachlorobenzene
Copper	Dieldrin	Alkyl-lead
Lead	Heptachlor	Mercury and its compounds
Nickel	Lindane	Mirex
Mercury	Mirex	Octachlorostyrene
Selenium	Oxychlordane	PCBs
Silver	Toxophene	Dioxins and furans
Zinc		Toxaphene

*U.S. Automotive Pollution Prevention Project. Progress Report III

APPENDIX F

CONCERNS ABOUT PVC AND OTHER PRODUCTS CONTAINING CHLORINE

The Maine Hospitals for a Healthy Environment Project
(Source: The Maine Hospitals for a Healthy Environment Project"
www.themha.org)

PVC and other chlorine-containing products are of concern on three levels:

- **Dioxins and furans** ("Dioxin compounds") are a class of persistent, bioaccumulative and highly toxic chemicals (PBTs) that are formed as byproducts when chlorine-containing materials are subject to accidental fires, waste incineration or other reactive environments. Chlorine-containing materials that are precursors to dioxin formation include polyvinyl chloride plastic (PVC or vinyl), chlorinated solvents, sodium hypochlorite (bleach) or other chlorine-containing chemicals or materials.

- **Chlorine and compounds containing chlorine** (including hypochlorite {bleach} and hypochlorous acid) are often used in cleaning agents because of their disinfecting qualities. Chlorine and chlorinated compounds are toxic to many organisms and, at certain levels, to humans. Chlorine and its compounds may also react chemically with other materials to create new compounds that are carcinogenic or mutagenic.

- **Polyvinyl chloride** is a plastic used to make durable products, including a wide variety of medical products and packaging for medical products. Polyvinyl chloride, also called PVC or vinyl, is also transformed into a soft plastic by adding large quantities of chemicals called phthalates. According to the American Chemistry Council, DEHP is the most commonly used phthalate. DEHP is the only phthalate plasticizer used in medical devices. In 1998, medical bags and tubing made in the U.S. contained more than 48 million pounds of DEHP. Animal studies have shown DEHP to be particularly harmful to the developing fetus. Other health effects include: malformations of the cardiovascular system; nervous system defects; developmental delays; and a variety of effects on reproductive development. A review of the literature is available at <http://www.sustainablehospitals.org/> . A research report on issues with PVC use in products in NICUs was included in the Work Book for Hospitals distributed in the spring.

To begin to address these issues, a four-step strategy is proposed to allow your facility to gather the necessary information it will need to take positive and responsible action and engage other resources to work with you on this issue.

Useful Web sites:

- **PVC in Medical Products** - Health Care Without Harm - problems and alternatives
- **Alternatives to PVC products for health care** – Sustainable Hospitals
- **** PVC White Paper** -Proceedings from the Setting Healthcare's Environmental Agenda conference of October 16, 2000
- **Neonatal Exposure to DEHP and Opportunities for Prevention** Health Care Without Harm
- **Use of Di-2-Ethylhexyl Phthalate in PVC Medical Devices: Exposure, Toxicity and Alternatives** - Health Care Without Harm
- **Dioxin and Related Compounds** – EPA
- **EPA Persistent Bioaccumulative and Toxic (PBT) Chemical Program** - EPA